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gate postulated by certain workers in the field of experimental embryology.

The polar bodies are said to spin like the cells of the egg for a long time after their formation and to remain so long in protoplasmic continuity with the other cells that there is a possibility they may not be entirely without a place in the developmental changes.

The peculiar activities of the protoplasm of these eggs together with many general questions connected with such phenomena will be considered in a second paper, now in press.

Though these remarkable phenomena are new to our knowledge of eggs the reviewer would suggest that what is here seen as living filaments may have appeared to other observers as a protoplasmic envelope on the outside of the egg. Thus it may be that the very thick covering "*Protoplasma mantel*" figured and described by Selenka[3] in the Ophuirid *Ophioglypha lacertosa* and the much thinner "*Protoplasma schicht*" in the Echinid *Strongylocentrotus lividus*, which also enters the cleavage cavity, are really a collection of spinnings, possibly somewhat pathological. In the last named case this outer envelope of the egg has recently been emphasized by Hammar[4] as a connection between the cells.

PHYSIOLOGY.

The action of the venom of the Australian Black Snake.—From numerous experiments detailed in a lengthy paper in the Journal and Proceedings of the Royal Society of New South Wales[1] C. J. Martin concludes briefly that the venom of the Australian black snake (*Pseudechis porphyriacus*) is comprehensive in its action, but affects principally the three most vulnerable points of the higher organism, namely, the blood, heart, and the respiratory center in the medulla. Its method of destroying life depends essentially upon the concentration with which the venom reaches the circulation. When the concentration reaches a certain limit, death may be almost instantaneous from a coagulation of the blood, thus ending circulation. If the concentration falls short of this the venom has the opposite effect of destroying the capacity of the blood to clot when shed. When this is the case any further injection of the venom fails to cause clotting within the vessels (thrombosis.)

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[3] Studien über Ent. Hft. 2. Wiesbaden, 1883.

[4] Archiv. f. Mik. Anat. March, 1896.

[1] XXIX (1896), pp. 146–278.

The action of the poison upon the heart and respiratory center is usually simultaneous. With the higher concentration it is the heart that fails first, with the lower concentration, it is respiration. Hence according to the concentration of the dose death may occur in from one to three days from clotting of the blood within the vessels, from cardiac failure, or from respiratory paralysis.

If the animal succeeds in passing these three possibilities it may yet succumb from secondary pathological changes in the lungs and kidneys. This last is not, however, a large risk, except in dogs, and if the animal survives the nervous and circulatory depression it usually recovers with wonderful rapidity.

The animals experimented upon were frogs, turtles, pigeons, rabbits, cats, dogs, and for man, upon his own blood. From the details that he records it is interesting to note that the venom destroys the red blood corpuscles, causing the hæmoglobin to dissolve out into the serum and escape through the kidneys in a crystalline form. In blood observed beneath the microscope the red corpuscles swell up to spherical masses, become transparent and finally disappear. All amæboid action in the white corpuscles is stopped. They finally become very granular, the nucleus appears distinctly as when the corpuscles are treated with acetic acid. Finally they are destroyed.

One very noticeable feature is that in common with other venom that of *Pseudechis* at first causes a scarcity of the white corpuscles; then this condition is followed by one in which they are more than normally present.

The action of the venom upon the dog is about ten times greater weight for weight, than upon any other animal. He says that the lowest limit of concentration necessary to produce the destruction of the blood corpuscles either within the body or *in vitro* is for dogs .00001 grammes of the venom to 100 c. c. of blood. The corpuscles of rabbits, guinea-pigs, cats, and white rats are much less easily destroyed. A concentration of .005 per cent. produced no destruction of the corpuscles of his own blood.

The blood plasmas that have lost all spontaneous coagulability may be coagulated by, (1) the addition of a saturated NaCl solution up to an equal volume, (2) the addition of an equal volume of a saturated solution of $MgSO_4$, (3) the addition of acetic acid until there is a slight evidence of acidity of the plasma, and (4) by the similar addition of sulphuric, hydrochloric, or phosphoric acid (Oxalic acid is ineffectual).

Very much larger amounts of the venom may be injected subcutaneously without producing the effects that follow intravenous injections. In this case the author thinks that the blood acquires an immunity to further doses. How long this immunity may last, however, he is not able to say.

The blood pressure (arterial) in the case of intravenous injections gradually falls until death. In the case of subcutaneous injections it falls for a while, then rises to near the normal and again falls until the death of the animal.

With this change in the blood pressure there is a corresponding change in the volume of the spleen and kidneys, both increasing in volume with the fall of blood pressure and decreasing with its rise.

The venom lessens the power of the blood to carry CO_2 and decreases the toxic powers of the serum over micro-organisms.

Heating to 85°C. lessens the power of the venom to destroy blood corpuscles and also its toxic qualities generally. This may be explained by the heat converting some of the proteids of the venom into an inert precipitate and secondly by its causing some change in their toxic power without, however, impairing their solubility or changing them in any may recognizable by chemical means.

Upon the nervous system the venom does not, as has been recorded for that of other snakes, have a curare-like action, but like them it causes a general paralysis, beginning with the lower and passing successively to the higher centers. Dogs poisoned with *Pseudechis* venom loose first the use of their hinder limbs.

There is no increase of respiration followed by a decrease as has been noted in other experiments, but instead a gradual decrease in both the amplitude and the number of respirations coinciding with the fall of blood pressure, except where the venom reaches the blood indirectly as in subcutaneous injections or through serous surfaces. In such cases there is a tendency to return to the normal.

The effect upon body temperature is such as to cause a rise or a fall in temperature according to the manner in which the venom reaches the blood, if this be slowly, it may cause a rise, if rapidily, a fall. As in the case of *Crotalus* venom as found by Sewall in animals more or less immunized by repeated small injections, a lethal dose may be followed by a rise in temperature.

Among the other pathological effects may be noted that it causes hæmorrhages in all of the organs of the body and from the mucous surfaces. Hæmorrhages are especially to be noted in the lungs. The urine of animals poisoned by *Pseudechis* always contains albumen, sometimes hæmoglobin, and frequently blood.

An idea of the toxic value of the venom may be obtained by comparing it with other poisons, basing the comparison upon the number of grammes of an animal, viz., a rabbit, killed by one gramme of the venom injected subcutaneously.

Cobra	4,000,000.
Hoplocephalus curtus . .	4,000,000.
Pseudechis	2,000,000.
Diptheria toxine . . .	4,000,000 (about.)
Anthrax albuminoses . . .	80.
Toxo-peptone	3,000.

—F. C. KENYON.

PSYCHOLOGY.[1]

The Year 1896 in Scientific Psychology.—While the past year has shown no startling developments in psychology, it has been marked by steady progress and an unusual amount of activity. The experimental laboratories everywhere have been busy, and a large number of Laboratory Studies have been published.

In this country the activity has been especially marked; the *Psychological Review* and the *American Journal of Psychology* have devoted more than usual of their space to experimental work. The psychological department of Cornell University has moved into larger quarters in Morrill Hall, where it is reported to have nine rooms and 4,000 square feet of space. The laboratory at the University of Nebraska has moved into the new library building, and occupies a series of five rooms and 3,000 square feet of space. A laboratory of experimental psychology has been fitted up during the year at the University of Kansas, under the charge of Prof. Olin Templin. The University of Chicago and Columbia University are preparing to establish their laboratories in ampler quarters, when the new buildings are completed.

In Russia it is reported that the Universities of St. Petersburg, Moscow and Kieff have taken steps, in connection with the Minister of Education, looking to the establishment of psychological laboratories. The University of Kieff has petitioned for an appropriation of about

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[1] Edited by H. C. Warren, Princeton University, Princeton, N. J.